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ABSTRACT

A study investigated the way in which children make use of morphemic information when they are learning to spell. Specifically, it examined the use of morphemic information in spelling compound words; the use made of morphemic information when adding suffixes to words, and the way the morphological rule governing the formation of the past tense is acquired. Subjects, 360 7-to-9-year-old children from 30 schools in Melbourne, Australia, were administered spelling tests over a 3-day period. Results showed that many of the children did not appear to be aware of the significance of the morphemic structure of the words they were asked to spell, and knowing how to spell a morpheme in one context did not ensure that it would be spelled correctly in another. The children's spelling of the irregular past tense morpheme indicated that they were attempting to apply a rule, but for many the rule was difficult to acquire. The bilingual children in the sample, as a group, were less competent than the monolingual children at making use of morphemic information, but the difference was not great, and the error patterns of the two groups were similar. (Author/FL)

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Research Report 1/82

LEARNING TO SPELL
THE WAY CHILDREN MAKE USE OF MORPHEMIC INFORMATION

VALERIE THOMAS

U.S. DEPARTMENT OF EDUCATION
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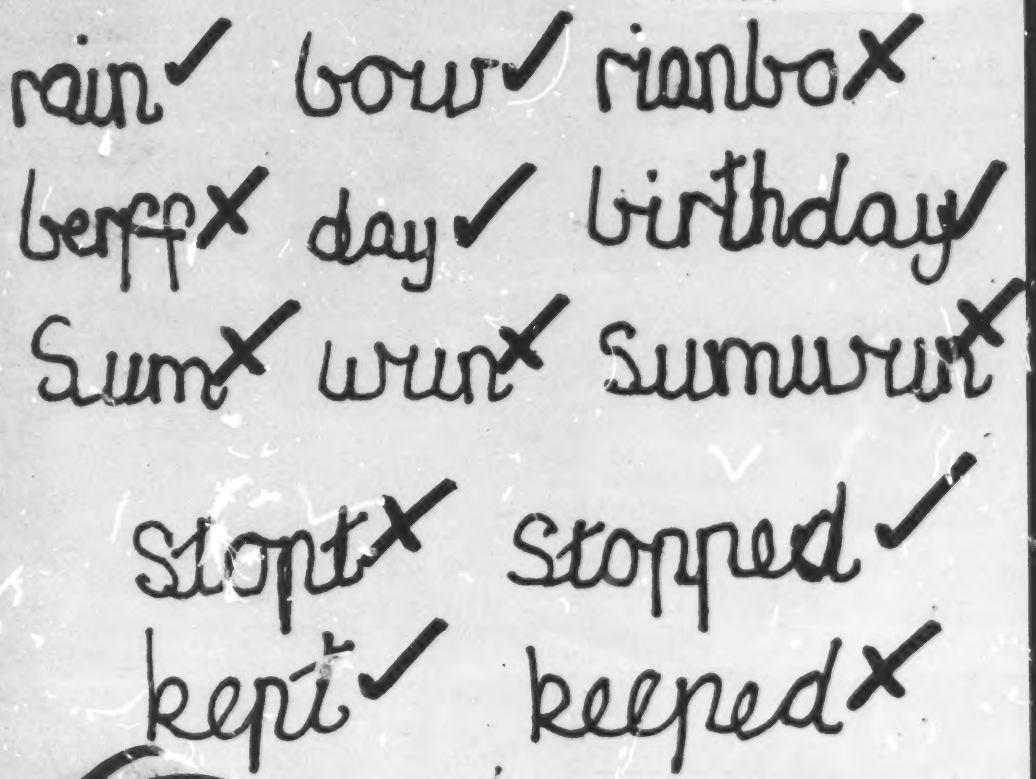

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Research Report 1/82

LEARNING TO SPELL

The Way Children Make Use of Morphemic Information

by

Valerie Thomas

Spelling Process Project Team

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ABSTRACT

This study examined the way in which children make use of morphemic information when they are learning to spell. Three areas were investigated: the use made of morphemic information in spelling compound words; the use made of morphemic information when a suffix is added to a word; and the way the morphological rule governing the formation of the past tense is acquired.

Many children did not appear to be aware of the significance of the morphemic structure of the words they were asked to spell; knowing how to spell a morpheme in one context did not ensure correct spelling in another context. It was clear from children's spelling of the irregular past tense morpheme that they were attempting to apply a rule, but for many children the rule was difficult to acquire. The bilingual children in the sample, as a group, were less competent than monolingual children at making use of morphemic information, but the difference was not great, and the error patterns for the two groups were similar.

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A morpheme is the smallest unit of meaning in the language. A word consists of at least one morpheme, and it may consist of more than one. For example, cat has one morpheme, while cats has two morphemes, the first being cat, a free morpheme which can stand alone, and the second s, a bound morpheme which adds the meaning of plurality. The word disagreements has four morphemes: dis agree ment s.

Morphology is the study of the ways in which morphemes are grouped into words. For example, there are morphological rules governing the way a word is made plural, or the way the past tense is formed.

Morphophonemics is the study of phonic variations which occur in morphemes when one morpheme is added to another, as, for example, the changes in the English past tense morpheme, which occurs as /d/ as in moved, /t/ as in stopped, and /ɛd/ as in started.

Introduction

Children who are learning to spell are faced with difficulties that diminish as their experience with language increases. A visual strategy is obviously of no use to them if they have never seen the word before, and a morphemic strategy, which makes use of the units of meaning in words, can only be utilized by the speller who is aware of their significance. An experienced speller who needs to write photomicrograph, an unfamiliar word, would probably divide the word into three known morphemes, and so produce the correct spelling. Not all words can be analysed as simply as this, of course; diarrhoea and gnu would provide more difficulty. But through experience of the way language works, the experienced speller is able to utilize strategies which are likely, but not certain, to lead to the correct spelling.

Beginning spellers are not so fortunate. Their experience of the written language is limited, and they must rely heavily on a phoneme-grapheme strategy, which is not a very reliable strategy for spelling the English language. To begin with, there are only 26 letters in the alphabet, and approximately 43 phonemes to be represented. Then there is the problem of the same letters representing different sounds, the most striking example of which is the ough in rough, though, through, cough and bough. To add to the pitfalls of a phoneme-grapheme strategy, the same sound is often represented by different letters; /i/ may be represented by ea - bead, ie - thief, ei - receive, e - me, y - hurry. Further difficulties are created by the existence of so many homophones in the English language. Homophones have the same sound - main and mane - and so the correct spelling can only be produced by referring to meaning. Silent letters, such as the k in known and the b in lamb, provide another complication. Therefore, children who are taught to rely only on a phoneme-grapheme strategy will soon find that this is inadequate, and unless they develop other strategies they are doomed to spelling failure.

As the young children's experience with written language increases, other spelling strategies become available to them. Some words they will learn by rote; many children learn to write their name in this way. Then, as they begin to read, they will build up a vocabulary of words they recognize, and for the beginning readers, who read

slowly and therefore pay more attention to individual words, this can be a useful aid to spelling. But, used unsupported by other strategies, a visual technique is insufficient.

The child who writes grils instead of girls appears to be relying on a visual strategy, whereas if an auditory strategy had also been used that particular error would not have been made. A visual strategy is useful, but used alone it may not be sufficient. The competent speller who wished to spell photomicrograph would have made some use of visual memory when recalling the parts of the word, but before this visual strategy could be utilized, the similarities between this word and others would have to be recognized. It is experience with language which allows these similarities to be recognized, a strategy which is at first denied to the beginning speller, but which becomes increasingly useful as more is learned about the language.

Such a strategy is of particular importance in a language such as English, which, while not being phonetically regular, reflects regularities existing at a deeper level than phoneme-grapheme correspondence. Noam Chomsky (1970) has described English orthography as being "a near-optimal system for representing the spoken language" (p.4). In his view, the ortnography represents meaning, and not merely sound. This is an aid to the reader, who can go straight to meaning, but it can provide difficulties for the speller, particularly one who has been taught to rely on a phoneme-grapheme strategy. The efficient speller, however, takes advantage of this structure, by using a spelling strategy which takes into account meaning, as well as sound - a morphemic strategy.

Beginning spellers are at first unable to make very much use of this morphemic strategy because of their lack of familiarity with the written language. They may be able to spell soft, for example, but misspell soften, where the t is silent, because they do not understand the relationship between soft and soften. They may be able to spell birthday, a high frequency word, but not birth, or every and thing, but not everything, because they do not understand the significance of the parts of a compound word. Of course, it is not just the beginning speller who fails to make use of a morphemic strategy when it is appropriate. Misspellings such as unecessary, dissappointed and disatisfied are common, and show a lack of understanding of the morphemic structure of the words.

Children must also learn to apply morphological rules such as those governing the formation of the plural and the past tense. For example, the past tense morpheme can be pronounced in three different ways: /d/ as in happened, /t/ as in helped, and /ɛd/ as in started. Children who are at the stage where they are relying on a phoneme-grapheme strategy will represent this difference in sound when they write, so that helped may be written as helpt, and happened as happend. Before they can produce the correct spelling, they have to learn to disregard sound and represent meaning. Then, having learned that the past tense inflexion, no matter how it sounds, is written as ed, they have to deal with words such as kept. At this stage some children will overgeneralize the

rule, so that kept will be spelled as keeped.

The aim of this study was to investigate the extent to which children make use of morphemic information when they are learning to spell. The major areas examined were the acquisition of morphological rules in the spelling of the past tense inflexion, and the use made of morphemic information in spelling compound words. A minor study on the addition of suffixes was also included.

Review of Research Literature

It is only in the last 10 or so years that researchers have begun to look at how children learn to spell; earlier research "focused simply on the what and not the why and how" (Henderson, 1976, p3.) Much of the early research was directed towards an examination of the structure of the language, in an attempt to describe the rules governing the orthography. The work of Charles Read with beginning spellers marked a change of emphasis; he was interested in what the children did when they began to spell.

Read (1971) examined the spelling of pre-school children, some of whom began to write as early as three and a half years of age, before they could read. They learned the names of the letters of the alphabet, then began to spell words with blocks, and finally composed written messages such as letters and stories. Read found that all of the children used approximately the same system: their judgements about the sounds they were representing were based on articulatory features, and were in many cases quite different from the judgements experienced spellers make. For example, troubles was written as CHRIBLES, and try as CHRIE. In English, /t/ before /r/ is articulated in the same manner as /tʃ/, which is written as ch. The children perceived this similarity, which adults have learned to ignore, and when they wrote the words, categorized /tr/ and /tʃ/ as similar in their spelling. The same type of categorization was evident in their representation of the alveolar flaps /t/ and /d/. When /t/ and /d/ occur between vowels in English they are articulated in the same manner; ladder and latter illustrate this very nicely. Adults, unless they are linguists, are not aware of the similarity, but Read's beginning spellers were, and they represented this similarity in their spellings. Letter was written as LADR, and pretty as PREDE.

But even at this stage, when the sound of the words was the basis for the children's spelling, they were not relying completely on sound, as shown by their representation of the plural. The sound at the end of windows, dogs and trees, /z/, is quite different from that at the end of cats, books and stamps, /s/, and the children were aware of the difference in these sounds; they could differentiate between sip and zip, and bus and

buzz. But they used s to represent the plural in every case, ignoring the difference in sound. The children were evidently aware of the function of the plural morpheme, and in this case chose to represent meaning, rather than sound.

Further evidence of the children's ability to make use of morphemic information is shown in their representation of the past tense inflexion. The ed inflexion can be pronounced as /d/ - arrived, /t/ - helped, and /ed/ - started; when they began to write, the young spellers represented this difference in sound. Helped was written as HALPT, and married as MARED. However, as the children continued to write, they moved from a phonetic spelling of the past tense inflexion to a morphophonemic spelling, using d fairly uniformly to produce spellings such as LOOKD and FIXD. Read found that while the children used phonetic spellings at three or four years of age, at five or six they were likely to begin to use a morphophonemic system; he documented in detail the progress of one child, Edith.

At 5 years 10 months Edith wrote stopped as STOP-T, but at 6 years peeked had become PEKD, and by 6 years 3 months she had adopted a systematic morphophonemic strategy for spelling the past tense, omitting the vowel from words like walked, which was represented as WALKD. At this age, Edith would have acquired some knowledge of the written language from reading and from adults, but Read considers that this information has been "'filtered' through the child's own notions, which exert a powerful influence on what he writes" (1971, p27). Exposure to written language is not sufficient in itself for children to acquire the spelling. They are developing an understanding of how the orthography works, and what they see and hear must be assimilated into their own systems.

Beers and Henderson (1977) also examined children's spelling of the past tense inflexion. They looked at the creative writing of first graders, and identified various types of spelling errors. Their conclusion was basically the same as that of Charles Read: in their spelling of the past tense inflexion, "the children appear to know that the same morphemic ending has different phonetic representations" (p144). The children were from a first-grade class in Maryland, U.S.A., which Beers and Henderson considered to be representative of the larger population of the area, and were in no way exceptional, a criticism which is sometimes made of the spontaneous spellers studied by Read. And yet they produced spellings of the same type, and showed the same ability to make use of morphemic information in their spelling. With little or no teaching, these children were beginning to use a morphemic approach to spelling.

That very young children can apply morphological rules in their oral language was demonstrated by Berko (1958). Berko tested children between the ages of 4 and 7 years, using nonsense words, because, as she states, "if a child knows that the plural of witch is witches, he may simply have memorized the plural form. If, however, he tells us that the plural of gutch is gutches, we have evidence that he knows, albeit unconsciously, one of the rules which the descriptive linguist, too, would set forth in his grammar" (p150). The areas tested were

the plural and the two possessives of the noun, the third person singular of the verb, the progressive and the past tense, and the comparative and superlative of the adjective. The children were shown a large card, with illustrations and text, and were asked to supply a missing word. For example, the first card showed one bird-like animal, with the caption: This is a wug. Underneath were two wugs, and the caption read, Now there is another one. There are two of them. There are two -.

The results of the tests were conclusive. Berko states that "the answers were not always right so far as English is concerned; but they were consistent and orderly answers, and they demonstrated that there can be no doubt that children in this age range operate with clearly delimited morphological rules" (p171). There were some differences between the pre-schoolers and the first-graders, but the improvement was in the perfecting of knowledge that they already had, and their answers used the same morphological rules. In examining the children's responses to the plurals, Berko comments: "It would be interesting to find out what the child thinks he is saying - if we could in some way ask him the general question, 'How do you make the plural?'" (p173). Read considers that his examination of the children's spelling of the plural answers this question:- "the children regard these plural alternants as a single form at the level relevant to spelling - just as adults do, in fact" (1971, p30).

A further study using Berko's Wug test was undertaken by Susan Selby (1972) with British children ranging in age from 3 years 6 months to 15 years 6 months. She found that the test was of most use with children between the ages of 4 and 12 years, and, like Berko, she found that the responses were "orderly and consistent" (p297). She concluded that only some morphological rules are well developed in the pre-schooler, others are partially developed and some are "virtually non-existent before school entry and up to the age of about 10" (p297). The comparative and superlative, in particular, were creating difficulty for some children at 14 or 15 years of age; Berko also found that the children did not have the comparative and superlative patterns "under control" (p176). The findings of the two researchers were similar, but Selby emphasizes the developmental aspect of the acquisition of morphological rules. Both researchers concluded that even the very youngest children were able to apply morphological rules in their oral language.

The relationship between the acquisition of morphological rules in oral language and writing is an interesting area. A study by Gibson, Shurcliff and Yonas (1970) indicates that oral language may play an important part in the development of morphological rules in written language. They used both deaf and hearing subjects in an enquiry into the way in which spelling patterns are acquired. As part of the experiment, the subjects were required to write a description of the way they were taught to read. There were practically no spelling errors in the answers of the deaf children, but there were a surprising number of what the researchers called "morphological

peculiarities" (p68), such as wrong tenses and confusion of singular and plural, as, for example: "I was taught to form letter when read" (p68). They conclude that "Evidently, it is very important to hear speech to learn to use these conventions consistently" (p70). The deaf children had learned the spelling patterns without hearing the sounds associated with them, but the morphological rules were apparently not acquired in the same way. A study by Jill Jackson (Elliott and Jackson, 1979) demonstrated that "children showed greater oral competence in applying morphophonemic rules than competence in using written morphological rules" (p103). Whether it is essential to be able to apply a rule in oral language before applying it to written language needs to be investigated. Carol Chomsky (1970) wrote that "it would not be at all surprising, perhaps for adults as well as children, if those who control the sound system of English better also exploit its orthography more effectively" (p302).

Berko (1958) also attempted to test young children's awareness of the separate morphemes in compound words. She comments that it "is entirely possible to use a compound word correctly and never notice that it is made of two separate and meaningful elements. It is also possible to use it correctly and at the same time have a completely private meaning for one or both of its constituent elements" (p152). The children were asked a direct question such as "Why do you think a blackboard is called a blackboard?" The answers were categorized into four types of explanations. The first were labelled answers of identity: a blackboard is called a blackboard because it is a blackboard. The second were labelled as statements of the object's salient feature: a blackboard is called a blackboard because you write on it. In the third category the salient feature happens to coincide with part of the name: a blackboard is called a blackboard because it is black. The fourth category was the etymological explanation, which takes into account both parts of the word: a blackboard is called a blackboard because it is a board which is black.

Only 13% of the children's answers were etymological. Most answers were of the salient features type, although for the youngest children 23% of the responses were in the identity category. The largest number of etymological responses was for the word thanksgiving, which is a word discussed with American children, but even so, 67% of children answered that thanksgiving is called thanksgiving because you eat lots of turkey.

Even amongst the small number of etymological answers, some were what Berko calls "private meanings": "Friday is a day when you have fried fish", or "Breakfast is called breakfast because you have to eat it fast when you rush to school." The children had considered the meanings of the morphemes; it was simply that their explanations did not coincide with the derivation of the words. It would be interesting to know how a child who thinks that Friday is a day for frying fish would spell the word.

PROCEDURE

An initial visit was made to each school to select subjects, meet the teachers, and choose a suitable working area. Three separate spelling tests were given in three testing periods, where possible on three consecutive schooldays, although school activities such as sports days and excursions sometimes necessitated a break in the sequence. The tests were administered to the Year 2 children in each school in a separate testing period, but the Years 3 and 4 were tested either together or in separate sessions, depending on the availability of the children and space for testing. Each word was presented first in a sentence, and then twice out of context. If the children asked for further repetitions, these were supplied. Five testers were used, and care was taken to ensure uniform pronunciation. The children were encouraged to attempt every word. They were told that the researchers were interested in the different ways the words were spelled, not in the numbers right and wrong. Collection of data commenced during the last week of October, 1979, and continued for six weeks.

Composition of the Spelling Tests:

This investigation into children's use of morphemic information was carried out in conjunction with two other investigations into aspects of children's spelling, one examining children's use of phoneme-grapheme relationships, and the other studying the way children make use of visual information. The test words from the three investigations were combined, resulting in a total of 128 words. These were divided into three tests, two of 43 words, and one of 42 words. Each test began with four of the most simple words, to provide an encouraging start. The remaining words were arranged in random order, except for those belonging to the study of compound words, which were distributed so that each compound word and its two parts were in separate tests. There were two versions of the tests, A and B. Both versions of each of the three tests began with the same four words, but in Version B the order of the remaining words was the reverse of that in Version A. Versions A and B were each given at 15 schools.

The Sample:

The sample was selected from 30 primary schools chosen at random from those designated by the Victorian Education Department as belonging to the Melbourne metropolitan area. (Teachers' Tribunal, Teaching Service Regulations, Regulation 4, Part 3(c). Education Gazette and Teachers' Aid, 12th December, 1979). Four children, two girls and two boys, were chosen from each of Years 2, 3 and 4 in the 30 schools, giving a sample of 360 subjects. The criterion for selection was date of birth: in Year 2, the two girls and two boys whose birth date was closest to 15.2.72 were selected; in Year 3, those closest to 15.2.71, and in Year 4, 15.2.70. This method of selection ensured that the sample of children at each year level was separated from the previous group by an age difference of approximately twelve months, as well as twelve months' schooling. If the sample had been selected at random, it would have been possible for a Year 3 child, for example, to be older than a Year 4 child, making it difficult to differentiate between the effects of age and schooling. The dates were chosen as being approximately the middle of the age range at each level. Children who had sight, hearing or speech defects were excluded from the sample, as were newly arrived migrant children: these were defined as children who had not had 2½ years at school in an English speaking country.

The Use of Morphemic Information in the Spelling of Compound Words

Berko (1958) tested children's awareness of the significance of the separate morphemes in compound words, using the children's oral language. She concluded that it is quite possible to use a compound word correctly, and yet not be aware of its constituent elements, a conclusion which may also be applicable to written language. An examination of children's attempts to spell compound words should reveal some interesting insights into their ability to make use of morphemic information.

If children are not aware of the significance of the parts of a compound word, they may be able to spell:

1. parts of the word, but not the whole;
2. the whole, but not the parts;
3. the whole, one part, but not the other part.

For example, children who frequently read and write the word birthday, as is common in infant classes, may be able to spell it correctly; day is a simple, frequent word which most children might be expected to spell correctly; but because birth is a less frequent word, children who have not realised the meaning of the two morphemes in birthday may spell birth correctly within birthday, and misspell it as a single word. On the other hand, children who are able to spell every and thing may be overwhelmed by the length of the word everything, and because of their lack of awareness of the morphemic structure of the word, misspell it. Where the compound words and the component words are all of high frequency, it would be expected that children would be able to spell the shorter components of the compound word correctly before they are able to spell the compound word. Where the frequency of the compound words and their component words vary, it would be expected that children spell the more frequent words correctly before the less frequent words, whether they be the compound or the component words.

As children's experience with language increases, they should develop a greater understanding of the morphemic structure of the language. One measure of children's experience with language is the time they have spent at school. It would therefore be expected that children's ability to make use of morphemic information should increase as they progress through the school. In this sample, children's ability to make use of morphemic information should be greater in Year 4 than in Year 3, and greater in Year 3 than in Year 2.

However, length of time at school is a measure only of the amount of exposure to language. Children develop in their ability to use language at different rates, and the spelling ability of children

within one year level will vary widely. One aspect of learning to spell is learning about the morphemic structure of the language. It is assumed that good spellers will make greater use of morphemic information than less competent spellers. Therefore, in this sample it is expected that children who show greater general spelling ability will make greater use of morphemic information in their spelling.

Children for whom English is a second language, particularly young children, would be expected to have had less exposure to English than native speakers. The amount of experience with the English language will vary greatly, depending on such factors as whether English is spoken at all in the home and how much time is spent in other environments where English is spoken, but, as a group, the bilingual children in this sample would be expected to have less understanding of the morphemic structure of the language, and therefore make less use of morphemic information in their spelling than native speakers.

Selection of Compound Words:

The words selected for this study were compound words and the single words of which they are constituted. They were grouped into two categories, those where the compound words and their parts were all from the first 600 words of The American Heritage Word Frequency Book, (Carroll et al, 1971), which were designated as high frequency words, and a second group where the frequencies of the parts and the whole varied. There were 11 words of the first category, and 15 of the second. The lists, and the frequencies of the words, are shown in Table 1. The words were distributed throughout the tests so that each compound word and its two parts were in three separate tests, with approximately equal numbers of compound, first part and second part of the words in each list. The approximations were due to the fact that the numbers of words were not exactly divisible by three: someone, sometimes, everyone, everything and anything all contained duplicated words, necessitating only 11 test words instead of 15.

TABLE 1

Frequencies of compound and component words.

1st Category - all high frequency words.

someone	(500-600)	some	(0-100)	one	(0-100)
sometimes	(200-300)			times	(200-300)
everyone	(400-500)	every	(100-200)		
everything	(400-500)			thing	(200-300)
anything	(400-500)	any	(100-200)		

2nd Category - compound and component words of varying frequencies.

birthday	(1,800-1,900)	birth	(2,700-2,800)	day	(100-200)
tribesmen	(10,400-10,500)	tribes	(2,400-2,500)	men	(100-200)
wheelbarrow	(10,200-10,300)	wheel	(1,100-1,200)	barrow	(27,000-27,100)
rainbow	(4,700-4,800)	rain	(500-600)	bow	(1,700-1,800)
newspaper	(1,500-1,600)	news	(1,200-1,300)	paper	(200-300)

Rank order as presented in The American Heritage Word Frequency Book (Carroll et al, 1971).

RESULTS

High Frequency words:

For all of the high frequency words, the components words were spelled correctly more often than the compound words, although for any/anything the difference was slight. Table 2 shows the total numbers and percentages of children who spelled the words correctly.

It is clear that someone, for example, was much more difficult to spell than either some or one. Children who spelled both some and one correctly produced a wide variety of misspellings for someone, such as somewon, somone, sumone, somewone, and sumwon.

However, any and anything were apparently of almost equal difficulty, and it might appear that all except three of the children who could spell any were able to spell anything. But this was not the case, as a closer analysis of the data revealed: 22 children were able to spell any, but misspelled any within the word anything, while another 22 children misspelled any, but spelled any within anything correctly.

TABLE 2

Total numbers and percentages of children who spelled the high frequency words correctly

someone	252 (70%)	some	301 (83.6%)	one	339 (94.2%)
sometimes	212 (58.9%)			times	284 (78.9%)
everyone	174 (48.3%)	every	191 (53.1%)		
everything	146 (40.1%)			thing	310 (86.1%)
anything	156 (43.3%)	any	159 (44.2%)		

Therefore, in order to obtain more precise information, the data were analysed into six categories, comparing each child's spelling of each part of the compound word with its spelling within the compound word: - i.e. the spelling of the word any was compared with the spelling of any within the word anything, for each child. See Table 3.

Using any/anything as an example, the six categories were:

1. Any spelled correctly in both any and anything.
2. Any spelled correctly, but misspelled in anything.
3. Any misspelled, but spelled correctly in anything.
4. Any misspelled in any and anything, but with consistent misspellings, e.g. enny, ennything.
5. Any misspelled in any and anything, inconsistently, e.g. enee, eneything.
6. No attempt in one or both words.

Table 3 shows the percentage of children in each category, for the high frequency words.

TABLE 3

Comparison of the spelling of high frequency compound and component words, showing percentages of children for each of the six categories.

	1. Correct Both	2. Correct Only Single	3. Correct Only Compound	4. Wrong Consistent	5. Wrong Inconsistent	6. No Attempt
some/someone	71.7	12.5	2.8	4.7	7.8	0.6
one/someone	81.9	10.8	0.8	0.3	3.6	2.5
some/sometimes	65.0	17.2	2.8	5.0	7.2	2.8
times/sometimes	66.1	11.9	3.9	6.9	7.5	3.6
every/everyone	44.7	8.9	4.7	14.4	25.3	1.9
one/everyone	87.2	3.6	0.8	0	3.6	4.7
every/everything	40.3	13.1	3.3	11.4	28.9	3.1
thing/everything	74.2	9.2	2.2	2.2	6.4	5.8
any/anything	37.8	6.1	6.1	13.9	32.2	3.9
thing/anything	76.7	7.8	3.9	0.3	6.7	4.7

Categories 2, 3 and 5 were assumed to be composed of children not using morphemic information. The numbers of children in these categories were therefore combined, and the percentages of children apparently not using morphemic information were calculated, omitting the children who made no attempt from the total. These percentages were then tabulated by Year level - see Table 4. It is evident that the percentage of children apparently not using morphemic information decreased as the time at school increased.

It is interesting to note that although all the words were from the first 600 words of the frequency table, the single words any and every, and compound words containing these words, were much more difficult for the children to spell. In Table 3, for example, the figures for category 5, inconsistently wrong spelling, are particularly high for these words. Most of the children who misspelled the words used a phonetic spelling. For any, enny, enee, ene, eney and enie were popular spellings, but while 13.9% of the children produced consistent misspellings for the any-anything comparison, 32.2% misspelled them inconsistently: eney-enethink; enny-enything; enney-enefing; enee-enthing. For every, evry was the most frequently occurring misspelling; at Year 2 level, 26 children spelled every correctly, while 32 wrote evry.

The word every, like some, one and thing, occurred three times, so that it was possible to examine the spelling in two compound words, as well as the single word. Fifty-six children produced three different incorrect spellings for every; 37 in Year 2, 14 in Year 3, and 5 in Year 4. For thing, 14 children spelled the word incorrectly in three different ways, 13 of them in Year 2; for some, 12 children produced three different incorrect spellings; and for one, which the great majority of children spelled correctly, there were only 6 children who wrote the word incorrectly in three different ways.

It is also clear from Tables 3 and 4 that the spelling difficulty of a single word when it became part of a compound word varied within different words. Every, for example, was more difficult to spell in everything than in everyone, and the percentages of children who were apparently not using morphemic information were greater for every within everything than for every within everyone. However, one within someone was more difficult than one within everyone, possibly because of the unfamiliarity of the vowel combination eo which occurs in someone.

The spelling of thing showed some interesting variations. Although the word was presented orally, such spellings as fing, fick, think and thick were common. Many children repeated the words softly as they wrote, and one child at Year 2 level was heard to pronounce the /k/ sound clearly at the end of anything. Thing was often spelled correctly by children who produced such combinations as evrything, thing, enythick. However, there were also combinations with three different types of misspellings, such as evefink, thin, ennyfick. Such misspellings occurred most often at Year 2 level, but even at Year 4 tnink, fing and fick still occurred. For example, 11 Year 2 children wrote think, at Year 3 it occurred 3 times, and twice at Year 4 level. Surprisingly, fing occurred most frequently at Year 3, with 13 examples, compared with 5 at Year 2 and 2 at Year 4.

TABLE 4

Percentages of children apparently not using morphemic information for high frequency compound and component words.

	YEAR 2	YEAR 3	YEAR 4
some/someone	41.5	17.5	10.8
one/someone	28.1	9.3	10.1
some/sometimes	41.5	27.6	14.6
times/sometimes	40.5	22.6	9.5
every/everyone	54.3	40.3	24.4
one/everyone	19.1	6.0	2.6
every/everything	68.4	41.4	31.1
thing/everything	38.0	13.4	6.7
any/anything	67.0	48.2	24.6
thing/anything	35.1	13.0	10.2

Words of Varying Frequencies

For the second group of words, those of varying frequencies, the component words were spelled correctly more often than the compound words, except for the birtn/birtnday combination. Birthday is a more frequent word than birth, and at every level was spelled correctly more often than birth. Table 5 shows the total numbers and percentages of children who spelled the words correctly.

TABLE 5

Total numbers and percentages of children who spelled the words of varying frequencies correctly.

birthday	249 (69.2%)	birth	178 (49.4%)	day	350 (97.2%)
tribesmen	91 (25.3%)	tribes	145 (40.3%)	men	341 (94.7%)
wheelbarrow	94 (26.1%)	wheel	235 (65.3%)	barrow	133 (36.9%)
rainbow	225 (62.5%)	rain	294 (81.7%)	bow	305 (84.7%)
newspaper	200 (55.6%)	news	275 (76.4%)	paper	280 (77.8%)

Men and day were the most frequent words, and these were the words most often spelled correctly, but the correlation between frequency and correct spelling, although high, was not perfect. For example, paper (200-300) is more frequent than bow (1,700-1,800), but more children spelled bow correctly. barrow is a less frequent word than wheelbarrow, and yet more children were able to spell barrow correctly. However, it must be remembered that the word frequency count used was of American origin, taken from reading material used in Grade 3 to Grade 9. An Australian word count of the 1500 most frequent words used in children's written language in Grade 2 to Grade 6 in New South Wales (Thomas, 1977) revealed some differences, although the two lists were basically similar. In particular, the word birthday occurred between 500-600 in the Australian list, whereas it was listed at 1800-1900 in the American count. In many Infant classes, where the day's news items are written on the board, and such announcements as "Today is John's birthday" are featured, birthday may be one of the most familiar words. It is not surprising that birthday was spelled correctly by so many of the children. One Year 2 child, for example, spelled birthday correctly, yet scored only 4 words correct out of the 128 words. Another Year 2 child, a creative speller who scored 8 out of 128, and who wrote news as hoangghairings and kept as kutivingdeng, produced birday for birthday, but wrote drteyarying for birth.

The data for the words of varying frequencies were also analysed into the six categories, comparing each child's spelling of each part of the compound word with its spelling within the compound word:- i.e. the spelling of the word birth was compared with the spelling of birth within birthday. Table 6 shows the percentages of children in each category. Once again, the birth/birthday combination was the exception to the general pattern, with 22.8% of children in category 3, those who spelled birth correctly in the compound word birthday, and misspelled the single word birth, but only 2.2% of the children in category 2, those who spelled birth correctly only in the single word. The wheel/wheelbarrow combination makes an interesting comparison: the percentages of children who spelled the word correctly in both the single and compound words were almost the same as for the birth/birthday combination, and yet only 1.7% were in category 3, compared with 18.6% in category 2.

Table 7 shows the percentages of children who were apparently not using morphemic information, those in categories 2, 3 and 5 of Table 6. Those children who made no attempt were omitted from the total before the percentages were calculated. Once again, the percentages of children apparently not using morphemic information decreased as the time at school increased.

TABLE 6

Comparison of the spelling of compound and component words of varying frequencies, showing percentages of children for each of the six categories.

	1. Correct Both	2. Correct Only Single	3. Correct Only Compound	4. Wrong Consistent	5. Wrong Inconsistent	6. No Attempt
birth/birthday	46.7	2.2	22.8	4.2	20.8	3.3
day/birthday	90.0	4.2	0.6	0.6	1.4	3.1
tribes/tribesmen	28.9	11.9	4.2	9.7	41.4	3.9
men/tribesmen	78.9	12.2	1.7	0.8	2.2	4.2
wheel/wheelbarrow	45.8	18.6	1.7	7.8	22.5	3.6
barrow/wheelbarrow	28.3	8.3	4.2	18.6	34.4	6.1
rain/rainbow	66.9	14.7	1.4	6.4	9.2	1.4
bow/rainbow	71.7	12.5	6.1	0.8	7.5	1.4
news/newspaper	64.2	11.7	3.6	3.9	13.9	2.8
paper/newspaper	64.2	11.7	3.9	6.4	8.6	5.3

TABLE 7

Percentages of children apparently not using morphemic information for compound and component words of varying frequencies.

	YEAR 2	YEAR 3	YEAR 4
birth/birthday	66.6	49.6	26.5
day/birthday	13.1	3.4	3.4
tribes/tribesmen	79.1	61.5	40.3
men/tribesmen	33.6	12.1	5.9
wheel/wheelbarrow	66.6	41.7	24.3
barrow/wheelbarrow	71.4	53.6	25.4
rain/rainbow	43.2	26.1	7.6
bow/rainbow	47.9	18.5	13.4
news/newspaper	50.0	31.1	9.4
paper/newspaper	44.0	20.9	12.8

General Spelling Performance:

The 300 subjects were then divided into three ability groups, using the scores on eighteen words which were included in the corpus of 128 words specifically as a test of general spelling performance. The words were selected from the first 10,000 words of The American Heritage Word Frequency Book, (Carroll et al, 1971). Six words were chosen from the first 1000 words, six from the 1000-2000 range, and six from 2000-10,000. As well as frequency, length of the words was also considered. Two short words (less than five letters), two medium length words (five to seven letters), and two long words (more than seven letters) were chosen randomly from each frequency range. Homophones and words with alternative spellings were omitted. Table 8 shows the words selected, and the selection criteria.

TABLE 8

Words used to measure general spelling performance, showing selection criteria.

	Short Words	Medium Words	Long Words
Frequency	moon	people	answered
range 0-1000	wide	anyone	afternoon
Frequency	cost	supper	suggested
range 1000-2000	bowl	imagine	watching
Frequency	dull	husky	horrible
range 2000-10,000	knob	revenge	destroyed

The group designated the low ability group consisted of 119 subjects, whose scores ranged from 0-4 words correct; the medium ability group, those who scored 5-10 correct, consisted of 122 subjects; and there were 119 in the high ability group, those who scored eleven or more correct. The numbers of children at each year level in each ability group are shown in Table 9.

The percentages of children apparently not using morphemic information were calculated, as in Tables 4 and 7, but using ability groupings instead of year levels. See Table 10. It is evident that spelling ability is a better predictor of the use of morphemic information than is year level, but even in the high ability group there was a considerable number of children not making use of morphemic information. Although 6.7% of the high ability group were from Year 2, the percentage of this group apparently not using morphemic information was higher than this for nine words out of the 20, so it cannot be assumed that it was only the younger children who were failing to make use of this information. In fact, for five of the words, more than 15% of the children in the high ability group produced inconsistent spellings; even the every/everything comparison, in the list of high frequency words, was spelled inconsistently by 18.6% of the high ability group. However, this was one of the most difficult words, with 83.8% of children of low ability spelling it inconsistently.

TABLE 9

Numbers of children at each year level in each spelling ability group

	Low Ability	Medium Ability	High Ability	
YEAR 2	79	33	8	120
YEAR 3	28	54	38	120
YEAR 4	12	35	73	120
Total	119	122	119	360

TABLE 10

Percentages of children apparently not using morphemic information, tabulated by spelling ability.

1. Compound and component words of high frequency.

	Low Ability	Medium Ability	High Ability
some/someone	51.3	14.0	5.0
one/someone	34.0	12.4	1.7
some/sometimes	55.2	20.2	7.8
times/sometimes	51.7	18.5	2.6
every/everyone	70.0	35.9	13.5
one/everyone	27.0	0	0.8
every/everything	83.8	40.0	18.6
thing/everything	47.0	9.2	4.2
any/anything	79.0	50.8	11.0
thing/anything	50.0	9.2	0.8

2. Compound and component words of varying frequency.

	Low Ability	Medium Ability	High Ability
birth/birthday	75.4	52.9	15.3
day/birthday	18.2	1.6	0.8
tribes/tribesmen	88.9	66.4	26.9
men/tribesmen	40.2	10.1	2.5
wheel/wheelbarrow	75.0	39.5	19.8
barrow/wheelbarrow	78.1	52.5	21.7
rain/rainbow	59.1	18.0	0.8
bow/rainbow	63.1	16.4	1.7
news/newspaper	68.5	22.1	1.7
paper/newspaper	54.0	19.8	6.8

The Use of Morphemic Information by Bilingual Children

During the initial visit to the school, information was collected on the language background of the children, and those children who had not had 2½ years at school in an English speaking country were omitted from the sample. Teachers were asked whether the children in the sample spoke another language, and if so, which language was spoken, but there was no information gathered on the child's facility with the second language, or whether it was the language used at home. For the purpose of this analysis, the children were divided into two groups: those who speak a second language, and those whose only language is English. While the limitations of the data were recognized, it was considered that some evidence of the ability of bilingual children to use morphemic information could be elicited.

The numbers of bilingual children at each year level are shown in Table 11. Bilingual children made up 22.5% of the sample. The percentages of children apparently not using morphemic information were then calculated, as in Tables 4 and 7, but using the two groups, bilingual and monolingual children, instead of year levels. See Table 12.

For nineteen of the twenty word comparisons, the percentages of children apparently not using morphemic information were higher for bilingual than for monolingual children, the only exception being the some/sometimes comparison, where the percentage was 1.9 higher for monolingual children. For the other nineteen comparisons, the percentage of bilingual children apparently not using morphemic information was higher by a range which varied from 14.9% for the any/anything comparison, to 2.7% for news/newspaper, with a mean of 7.2%.

However, when the percentages of bilingual children apparently not using morphemic information are compared with the percentages for the three ability groups, in Table 10, it is evident that the bilingual children are able to make much more use of morphemic information than the children in the low ability group. An analysis was made of the ability scores of the bilingual children, (see Table 13), and while the numbers of monolingual children were higher in the high ability group and lower in the low ability group than the bilingual children, the differences were not great.

TABLE 11

Numbers of bilingual and monolingual children at each year level.

	Bilingual children	Monolingual children	
YEAR 2	29	91	120
YEAR 3	24	96	120
YEAR 4	28	92	120
Total	81	279	360

TABLE 12

Percentages of bilingual and monolingual children apparently not using morphemic information.

1. Compound and component words of high frequency.

	Bilingual Children	Monolingual Children
some/someone	28.7	21.6
one/someone	20.5	14.3
some/sometimes	26.2	28.1
times/sometimes	27.8	23.1
every/everyone	44.9	38.5
one/everyone	13.5	7.1
every/everything	51.3	45.4
thing/everything	22.7	17.8
any/anything	57.9	43.0
thing/anything	24.7	17.3

2. Compound and component words of varying frequencies.

	Bilingual children	Monolingual children
birth/birthday	51.3	46.3
day/birthday	12.0	5.1
tribes/tribesmen	65.8	58.1
men/tribesmen	19.0	16.2
wheel/wheelbarrow	53.3	41.9
barrow/wheelbarrow	60.8	47.0
rain/rainbow	29.1	24.6
bow/rainbow	32.9	24.6
news/newspaper	37.2	27.9
paper/newspaper	27.6	24.9

TABLE 13

Numbers and percentages of bilingual and monolingual children in each spelling ability group.

	Low Ability	Medium Ability	High Ability	
Bilingual children	32 39.5%	25 30.9%	24 29.6%	81 22.5%
Monolingual children	87 31.2%	97 34.8%	95 34.1%	279 77.5%
	119	122	119	

DISCUSSION

It is clear that many children are not aware of the significance of the morphemic structure of compound words. Children who are able to spell a word in one context will often misspell it in another.

In the high frequency words, the shorter parts of the compound words were spelled correctly more often than the whole compound word, although the difference was slight for any/anything. However, the large variations in the numbers of children able to spell words of similar length and frequency suggest that there are other factors which affect the spelling difficulty of words, one of which may be the familiarity of the letter combinations within words.

For the words of varying frequencies, the shorter parts of the compound words were spelled correctly more often than the whole compound word, except for birth/birthday. birthday was spelled correctly more often than birth, a less frequent word than birthday. It would seem that some children who are able to spell birthday are not aware of the significance of the word birth, and so are unable to make use of the knowledge they possess.

When the ability of the children to make use of morphemic information was analysed by year level, it was evident that the numbers of children apparently not using morphemic information were greater in Year 2 than in Year 3, and in Year 3 than in Year 4. Part of the explanation for this may be that more children in the higher year levels spelled the words correctly, and so there were fewer children in all of the other categories. When the words are spelled correctly, it is not possible to come to any conclusion about the strategies used. It may be that the words have all been learned independently by rote: the child may have learned to spell wheel, barrow and wheelbarrow as three separate words. However, while this is a possibility, it does seem unlikely as a complete explanation for the results. To learn words independently by rote is an inefficient method of learning to spell. As children's experience with language increases, it would be expected that their ability to make use of morphemic information would also increase. But even at Year 4 level, there are still considerable numbers of children who are failing to make use of morphemic information: who, for example, can spell wheel and barrow, but not wheelbarrow.

The scores of the three ability groups show that it is not only children of low spelling ability who fail to make use of morphemic information. Although the numbers of children failing to make use of morphemic information were much greater for the low ability group, considerable numbers of children in the high ability group produced inconsistent spellings for many of the words. Such results indicate that even children who are generally competent spellers need help in perceiving the morphemic structure of compound words.

While the bilingual children made less use of morphemic information than native speakers, the differences were not great. It was expected that bilingual children would have less understanding of the structure of the language, and would therefore make less use of morphemic information. However, it may be that children learning English as a second language pay more attention to the structure of the language, either through direct instruction or because their lack of familiarity with the language encourages them to look for some order in the system of orthography.

Many of the children who failed to make use of morphemic information appeared to be using a strategy of matching phonemes and graphemes, which was not sufficient to supply the correct spelling, or even to supply consistent spelling. The ability to make use of morphemic information is an important aspect of the spelling process, and teachers should be aware that many children need help in perceiving the morphemic structure of compound words.

The Use of Morphemic Information in the Addition of Suffixes

THE USE OF MORPHEMIC INFORMATION IN THE ADDITION OF SUFFIXES

In conjunction with the investigation into children's use of morphemic information in their spelling of compound words, a minor study was carried out into the use of morpnemic information when a suffix is added to a word. Only four words were used: soft, soften, and climb, climber. It was envisaged that this would provide a clear, simple illustration of the way children learn to make use of morphemic information.

Soft is a high frequency word, it is short and is phonetically regular. Most children should be able to spell it. If they realize the connection between soft and soften, soften should not be a difficult word to spell. But because soften is a much less frequent word, and because the t is silent, many children could be expected to misspell it. The final morpheme may also present difficulties.

In both climb and climber, the b is silent. Therefore the children who spell climb should also be able to spell climber, as long as they can also spell the final morpheme. However, climber is a less frequent word, and is longer, so that children might be expected to find it more difficult to spell than climb.

As children learn more about the language, they should come to realize the relationship between such words as soft/soften and climb/climber. One measure of children's experience with language is the time they have spent at school. In this sample children in Year 4 should make more use of morphemic information in their spelling of soft/soften and climb/climber than children in Year 3, and more in Year 3 than in Year 2.

However, the length of time at school is a measure only of the children's experience with language. Children vary in their ability to use language, and within one year level at school the spelling ability of the children will vary widely. The ability to make use of morphemic information is one aspect of learning to spell; therefore, children of greater general spelling ability in this sample should be expected to make greater use of morphemic information in their spelling of soft/soften and climb/climber.

Children for whom English is a second language would be expected to have had less exposure to the English language than native speakers, and therefore to have less understanding of the morphemic structure. Although the quality and quantity of the exposure to the language of these children will show great variation, it would be expected that, as a group, the bilingual children in this

sample would make less use of morphemic information in their spelling of soft/soften and climb/climber than native speakers.

Test Words

The four words were included in the corpus of 128 words. Both climb and soft were in List 1, and soften and climber were in List 2.

Frequencies

soft	(700-800)
climb	(1,600-1,700)
soften	(10,000-10,100)
climber	(14,200-14,300)

The frequencies were taken from The American Heritage Word Frequency Book (Carroll et al, 1971).

RESULTS

Table 14 shows the total number of children at each year level who spelled the four words correctly. It is clear that the soft/soften combination produced results which are quite different from the results of the climb/climber combination. Soft was spelled correctly by a majority of children at each level, but soften was much more difficult; climb was spelled correctly by fewer children, but they were more likely, having spelled climb correctly, to produce the correct spelling for climber.

It would appear from these results that many of the children were relying on a phoneme-grapheme matching strategy, which would produce the correct spelling for soft, but not for soften, where the t is silent. Because the silent b is present in both climb and climber, children using a phoneme-grapheme strategy would omit the b in both words; having learned of the existence of the b they would be more likely to use it to spell both climb and climber.

An examination of the data supports this supposition. While 89 Year 2 children spelled soft correctly, only 7 produced the correct spelling for soften. The most popular spelling for soften was sofen (29 responses); other spellings at this level were sofn (11), sofin (8), sofon and sofen (4 examples of each), and one response each of soffen, soffon, soffn, and sofern.

At Year 3 level, sofen was still the most common spelling, with 37 responses compared with 34 responses of soften. Only at Year 4 level was soften the most frequently occurring response, and even at this level there were 34 responses of sofen, 11 of soffen, and one of sophen.

For the climb/climber combination there was also a large variety of phonetic spellings. There were three responses of climba at Year 2 level, and one of climbar, and one response of climba at Year 3. There were also five responses where the b was included, but the m omitted, two at Year 2 level and three at Year 3, so that spellings such as clib, cliber and cliba were produced. But, in general, once the b was included, the word was spelled correctly.

TABLE 14

Total numbers and percentages of children who spelled the words soft, soften, climb, climber correctly.

	Soft	Soften	Climb	Climber
YEAR 2	89 74.2%	7 5.8%	26 21.7%	16 13.3%
YEAR 3	107 89.2%	34 28.3%	67 55.8%	61 50.8%
YEAR 4	113 94.2%	63 52.5%	94 78.3%	84 70.0%

However, even with the climb/climber combination, being able to spell climb was no guarantee of being able to spell climber, and in 12 cases, children who spelled climb correctly within the word climber, misspelled the word climb in isolation. Computations were made of the spelling of the word climb, compared with the spelling of the root word climb in climber - see Table 15. There were six categories:

1. climb spelled correctly in both climb and climber.
2. climb spelled correctly, but misspelled within climber.
3. climb misspelled, but spelled correctly in climber.
4. Both climb and climber misspelled, but with consistent misspellings e.g. clim, clima.
5. Both climb and climber misspelled, inconsistently, e.g. klim, climer.
6. No attempt in one or both words.

The numbers of children in categories 2, 3 and 5 were then combined, and the percentages of children who were apparently not using morphemic information were calculated, after omitting the children who made no attempt - see Table 16. It is evident that the percentages of children apparently not using morphemic information decreased as the time at school increased.

TABLE 15

Percentages of children in the six categories, for the climb/climber comparison.

	YEAR 2	YEAR 3	YEAR 4
1. Correct in both words	15.8	45.8	68.3
2. Correct only in climb	5.8	10.0	10.0
3. Correct only in climber	0.8	5.8	3.3
4. Wrong - consistent	24.2	18.3	11.7
5. Wrong - inconsistent	51.7	20.0	5.8
6. No attempt	1.7	0	0.8

TABLE 16

Percentages of children apparently not using morphemic information in their spelling of climb/climber.

YEAR 2	YEAR 3	YEAR 4
59.3%	35.8%	19.2%

TABLE 17

Percentages of children in the six categories, for the soft/soften comparison.

	YEAR 2	YEAR 3	YEAR 4
1. Correct in both words	13.3	33.3	54.2
2. Correct only in soft	60.0	56.7	40.0
3. Correct only in soften	0	0.8	0
4. Wrong - consistent	0	1.6	0
5. Wrong - inconsistent	24.2	6.7	5.0
6. No attempt	2.5	0.8	0.8

When the equivalent calculations were made for the soft/soften combination, some interesting variations emerge. Table 17 shows the 6 categories comparing the spelling of the word soft with the spelling of the root word soft within soften.

Because of the difficulty caused by the silent t which occurred in soften, but not soft, numbers were much greater in Category 2 than for the climb/climber combination, and only two children made consistent errors, compared with 65 for climb/climber. The percentages of children apparently not using morphemic information, shown in Table 18, was greater for the soft/soften combination than for climb/climber at each year level.

TABLE 18

Percentages of children apparently not using morphemic information in their spelling of soft/soften.

YEAR 2	YEAR 3	YEAR 4
86.3%	64.7%	45.4%

TABLE 19

Percentages of children who spelled the final morphemes en and er correctly.

	YEAR 2	YEAR 3	YEAR 4
en in soften correct	33.3%	70.0%	85.0%
er in climber correct	42.5%	80.0%	88.3%

The children's spelling of the final morpheme in soften and climber was also examined - see Table 19.

It is evident that by Year 4 most children could spell the final morphemes correctly, even when they were unable to spell the complete word. However, at Year 2 level a large number of phonic variations were used for both final morphemes. For en in soften, at Year 2 the most frequently occurring incorrect spelling was a single n, used 38 times, with in occurring 11 times, on 7 times, an 5 times and one case of ern. An interesting variation was ing, which occurred 8 times at Year 2, and 9 times at Year 3 level. By Year 3, a single n appeared only 5 times, there were 8 cases of in, and one each of un, ern, on and n.

For the er in climber there were also many phonic variations at the Year 2 level. A single a occurred 25 times, a single y 9 times, there were 6 cases of ar, 2 each of ae and a single r, and one each of ur, ing, e, aer and ue. But by Year 3 the range had decreased to 4 variations: 12 examples of a single a, 2 examples of a single e, and one each of ea and are. And by Year 4, although there were still 7 cases of a single a, other variations were limited to one case each of ing, e and an.

General Spelling Performance

The children were then divided into three ability groups, using the scores on eighteen words which were included in the corpus of 128 words specifically as a test of general spelling performance. The percentages of children apparently not using morphemic information in their spelling of soft/soften and climb/climber were then calculated, as in Tables 16 and 18, but using ability groups instead of year levels - see Table 20.

TABLE 20

Percentages of children apparently not using morphemic information in their spelling of soft/soften and climb/climber, tabulated by spelling ability groups.

	Low Ability	Medium Ability	High Ability
soft/soften	89.6%	72.7%	34.4%
climb/climber	67.2%	38.5%	9.2%

TABLE 21

Percentages of children who spelled the final morphemes en and er correctly, tabulated by spelling ability groups.

	Low Ability	Medium Ability	High Ability
en in soften	30.2%	66.4%	91.6%
er in climber	28.6%	82.8%	99.2%

As with the compound words, spelling ability was a better predictor of the use of morphemic information than year level, but, particularly with the soft/soften comparison, there was still a considerable number of children in the high ability group who were not making use of morphemic information.

The children's spelling of the final morpheme in soften and climber was also analysed by ability groups - see Table 21.

The spelling of the en in soften showed much the same distribution through the three groups as the analysis by year level, but the results for the er in climber showed fewer children in the low ability group able to spell the er morpheme correctly than in Year 2, and only one child in the high ability group who misspelled it. It would appear that inability to spell er as a final morpheme is a distinctive feature of the low ability group.

Bilingualism

Information on the language background of the children was collected, and the children were divided into two groups, bilingual and monolingual. There were 81 bilingual children, and 279 monolinguals. The percentages of children apparently not using morphemic information were calculated, as in Tables 4 and 6, but using language background instead of Year level. See Table 22.

TABLE 22

Percentages of children apparently not using morphemic information in their spelling of soft/soften and climb/climber, tabulated by language background.

	Bilingual children	Monolingual children
soft/soften	72.6%	63.4%
climb/climber	50.6%	34.4%

The results showed the same pattern as for the compound words: the bilingual children apparently made less use of morphemic information than the monolingual children, but were able to utilize morphemic information much more than the children in the low ability group. For the numbers of bilingual children in each ability group, see Table 13.

The children's spelling of the final morphemes in soften and climber was also analysed by the language background of the children. See Table 23.

The monolingual children were better than the bilingual children at spelling the final morpheme, but the differences between the scores at the three year levels (Table 19), and between the three ability groups (Table 21) were much more marked.

TABLE 23

Percentages of children who spelled the final morphemes en and er correctly, analysed by language background.

	Bilingual children	Monolingual children
en in soften correct	64.2%	72.0%
er in climber correct	53.1%	65.6%

DISCUSSION

The very large numbers of children at each year level who could spell soft, but not soften, indicate that children often are not aware of the morphemic structure of words they are attempting to spell. The most common strategy used to spell soft/soften appeared to be a phoneme-grapheme matching strategy, which produced the correct spelling for soft, but not soften. This was particularly prevalent at Year 2 level, but was still clearly in evidence by Year 4; the Year 4 child who wrote sophen was not relating soft and soften. It may be that oral presentation of the words encourages the use of a strategy using the sound of the words, but the very large numbers of children who omitted the silent t in soften suggest that this is not the only relevant factor.

While the scores for climb and climber did not show as marked a difference as the soft/soften combination, there were still considerable numbers of children who were able to spell climb correctly, but misspelled climb within climber, or who spelled climb within climber correctly, but misspelled climb. Such results show that knowing how to spell a word in one context does not ensure correct spelling in another context.

When the spelling of the final morphemes en and er was examined, it appeared that the initial strategy for many children, particularly those in Year 2, was to attempt to match phonemes with graphemes, which produced incorrect spelling in many cases. However, by Year 4 most children were able to spell the two final morphemes correctly.

The numbers of children apparently not making use of morphemic information were greater in Year 2 than in Year 3, and greater in Year 3 than in Year 4, for both word pairs. As with the compound words, this may be explained in part by the fact that more children in the higher years spelled the words correctly, which entailed fewer children in all the other categories, but it seems unlikely that all of the children who spelled the words correctly had learned them independently by rote. As the children's experience with language increases, their understanding of the morphemic structure of the language should also increase, and this should help them to make use of morphemic information to produce the correct spelling. However, even by Year 4 there were still considerable numbers of children apparently not making use of morphemic information: at Year 4 nearly half of the children produced inconsistent spellings for soft/soften.

The results of the analyses by general spelling ability revealed the same trends as for the compound words: it was not only children of low spelling ability who failed to make use of morphemic information. In fact, for soft/soften, more than one third of the children in the high ability group were apparently not using morphemic information. And in both bilingual and monolingual groups, there were considerable numbers of children who produced inconsistent spellings for both word pairs. It seems clear that many children, at each of these year levels, no matter what their language background or general spelling ability, need help in making use of morphemic information when a suffix is added to a word.

Children's Spelling of the Past Tense Morpheme

This section, which examines children's spelling of the past tense morpheme, used as its starting point part of a study carried out by Jill Jackson in 1978. (See "Children's Acquisition of Morphological Rules in Oral and Written Production", in Children's Spelling Strategies, Elliott and Jackson, 1979.) Jackson investigated both oral and written production of morphological rules, while this study examines only written production of the past tense morpheme.

In order to spell the past tense morpheme correctly, children must learn to apply the morphological rule, instead of relying on the sound of the final morpheme. They must recognize that the word they are about to spell belongs to the category of past tense words, so that stopped, which sounds as if it should end with a t, is in a different category from attempt and except. The work of Charles Read (1971) and Beers and Henderson (1977) shows that many children who are beginning to learn to spell use a phoneme-grapheme matching strategy at first, then move later to a morphophonemic system.

Jackson hypothesised that there is a predictable pattern in children's acquisition of morphological rules, that children who have had little formal teaching of spelling would begin by using a phoneme-grapheme matching strategy, and that the correct spelling of the inflexional morphemes would be produced in frequent words before less frequent words. Support was gained for these hypotheses. For the past tense morpheme specifically, Jackson found that most Year 2 children were not applying a morphological rule, but were representing sound.

This study aimed to discover if there is a developmental sequence in the acquisition of the morphological rule for spelling the past tense. If, as other researchers have discovered, (Read, 1971; Beers and Henderson, 1977; Jackson, 1979), children begin by representing sound instead of meaning, words such as started should present the least difficulty, because the sound is of a vowel plus /d/, although, as the vowel sound is not clear, the final morpheme may be written as id or even ud. Words such as stopped, where the final sound is /t/, and moved, where it is /d/, should be more difficult. A further difficulty is encountered in the spelling of irregular words such as kept. The child using a phoneme-grapheme matching strategy is likely to produce the correct spelling. The child who has learned to apply the morphological rule may attempt to spell kept with a final ed, as the rule normally requires, and will therefore produce incorrect spelling. The rule must be learned

in order to produce correct spelling for regular words, but the child must also learn the words which are exceptions to the rule.

It would also be expected that children would produce the correct spelling of the past tense morpheme in frequent words before less frequent words. A frequent word such as stopped may be learned as a sight word, and thus the correct spelling may be produced before the morphological rule for the past tense is learned. With less frequent words, the child is less likely to be familiar with the word, and so less likely to produce the correct spelling without applying the morphological rule.

Children in Year 4 would be expected to show greater ability at producing the correct spelling of the past tense morpheme than children in Year 3, and Year 3 children should be better than those in Year 2. Length of time at school is one measure of the amount of exposure to language; the more exposure children have had to language, the more opportunity they have had to come to an understanding of the rule for forming the past tense.

However, the amount of exposure to the language is only a measure of the quantity of the children's language experience. The quality of the children's language is also important, and both these factors should be reflected in the children's general spelling ability. Learning to apply morphological rules is one important aspect of learning to spell, and so children who are generally competent spellers would also be expected to be competent at applying morphological rules.

It would also be expected that children for whom English is a second language would be less likely to produce the correct spelling for the past tense morpheme than native speakers. Bilingual children would be expected to have had less exposure to the English language than native speakers; it would also appear likely that the experience they do have with the language would be more restricted in range and complexity. Therefore, the opportunities for coming to an understanding of the morphemic structure of the language, and the orthographic rules, would be expected to be more limited than for native speakers.

Subjects

Jackson used 40 subjects, five boys and five girls from Years 2 and 6 in two schools. This study used 360 subjects, 2 boys and 2 girls from each of Years 2, 3 and 4 in 30 schools in the Melbourne metropolitan area. It was felt that the use of three consecutive year groups would better allow for developmental trends to emerge. Full details of the sample selection and procedure are given on page 16.

Spelling Test Words

Four changes were made to the test words used by Jackson, but the other twelve words were the same, and the same categories of high and low frequency words were used. High frequency words were designated as those from the first 500 words of The American Heritage Word Frequency Book , (Carroll et al, 1971). Low frequency words were taken from the frequency range 10,000 to 10,500. In each of the frequency categories there were eight words: two words where the past tense inflexion is pronounced /ɛd/, two where it is pronounced /d/, two with /t/ pronunciation, and two irregular past tense forms. The test words were distributed randomly throughout the corpus of 128 words.

TABLE 24

Test words for the past tense morphemes

	/ɛd/	/t/	/d/	irregular
High frequency words	needed started	looked asked	called moved	held kept
Low frequency words	amounted halted	untouched blinked	consumed teased	rebuilt dealt

RESULTS

Table 25 shows the percentages of correct responses for the spelling of the regular past tense morpheme, tabulated by year level for both high and low frequency words. It is clear that the children's ability to spell the final morpheme increased as the year level increased. However, the increase between Year 2 and Year 3 was much greater than that between Year 3 and Year 4, suggesting that it is between Year 2 and Year 3 that many children learn to apply the morphological rule. There was improvement between Year 3 and Year 4, and by the end of Year 4 - the data were collected in November - most children had mastered the spelling of the regular past tense morpheme for high frequency words, but fewer produced the correct spelling for the low frequency words. At every year level, more children were able to spell the past tense inflexion correctly for high frequency words than for low frequency words, which indicates that at least some of the high frequency words may have been familiar enough for the children to spell without applying the rule.

TABLE 25

Percentages of correct responses for the spelling of the regular past tense morpheme, tabulated by year level for both high and low frequency words.

	High frequency words	Low frequency words
Year 2	51.7	36.6
Year 3	82.6	69.7
Year 4	91.3	83.5

Table 26 shows the percentages for each type of response produced for the spelling of the past tense morpheme for both high and low frequency words, tabulated by year level.

TABLE 26

Percentage responses for the regular past tense morpheme on high and low frequency words, tabulated by year level.

High frequency words

	Year Level	ed	t	d	other vowel + d or t	et	other
/ɛd/ started needed	2	60.0	1.3	7.1	3.7	0	27.9
	3	85.4	0.4	3.3	2.5	0	8.3
	4	94.6	0.4	2.1	0.4	0	2.5
/t/ asked looked	2	49.2	19.6	5.8	0	2.5	22.9
	3	82.9	5.0	2.1	0	0.8	9.2
	4	89.6	4.2	0.8	0	0.4	5.0
/d/ moved called	2	45.8	7.9	24.6	0	0.8	20.8
	3	79.6	0.8	12.1	0	0	7.5
	4	89.6	0.8	6.3	0	0.4	2.9

Low frequency words

	Year Level	ed	t	d	other vowel + d or t	et	other
/ɛd/ amounted halted	2	50.4	2.5	7.1	3.7	2.9	33.3
	3	79.2	1.3	4.2	2.1	0.4	12.9
	4	91.7	0.8	2.1	0.4	0.8	4.2
/t/ untouched blinked	2	33.8	23.3	4.6	0.8	2.5	35.0
	3	70.0	6.7	1.3	0	1.7	20.4
	4	81.3	5.4	0	0	0.8	12.5
/d/ consumed teased	2	25.8	14.6	21.3	0.4	1.3	36.7
	3	60.0	5.8	15.8	0	0	18.3
	4	77.5	3.8	9.2	0.4	0	9.2

For both high and low frequency words, the greatest number of correct responses was for the /ɛd/ morpheme, and the /d/ morpheme proved most difficult. That many children, particularly those in Year 2, were using a phoneme-grapheme matching strategy is shown by the numbers who represented the /t/ morpheme with a t, and the /d/ morpheme with a d. The children who represented the /ɛd/ morpheme with d plus a vowel other than e were probably also representing sound; id was the most common representation, but ad, od and ud were also used. The et was an interesting variation. The children may have learned that the e is part of the past tense morpheme, and included that, while still representing the sound of the t.

One notable feature of Table 26 is the high number of responses in the "other" category, particularly for Year 2 children. Many of these occurred because the child produced apparently random letter sequences, such as goodroon for called, hirein for moved, and ftop for halted. Another frequent error was to simply omit the final morpheme: untouch, blink, look, need. The "other" category is greater for low frequency words than for high frequency words, which may be explained by the fact that the children, when faced with an unfamiliar word, tended to attempt only part of the word, and often did not produce a recognizable version of the final syllable: csyb for consumed, hotno for halted, untot for untouched, amtda for amounted.

The Irregular Past Tense

Four words with irregular past tense forms were tested: two of high frequency, kept and held, and two of low frequency, rebuilt and dealt. The spellings of the irregular words were coded in the same manner as for the regular words, and then the categories were reduced to three: the correct spelling of the final morpheme; the final morpheme spelled with an ed; and all other responses. Table 27 shows the percentages of responses for the high frequency words and the low frequency words, tabulated by year level.

It is evident that children over generalized the regular inflexion to the irregular words more often for frequent words than for infrequent words. This is possibly because they

TABLE 27

Percentage responses for the past tense morpheme on irregular high and low frequency words, tabulated by year level.

High frequency words - kept, held.

	correct	ed ending	other
Year 2	68.2	9.6	22.1
Year 3	76.7	14.2	9.2
Year 4	85.4	8.3	6.3

Low frequency words - rebuilt, dealt.

	correct	ed ending	other
Year 2	72.1	1.7	26.2
Year 3	82.1	2.1	15.8
Year 4	92.5	0.8	6.7

were aware of the relationship of kept to keep, for example, but not of dealt to deal. Not one child produced the spelling dealed for dealt, and only ten children from the sample of 360 subjects spelled dealt correctly, seven from Year 4 and three from Year 3. The most common spelling was delt, produced by 190 subjects, and none of the subjects who misspelled the word used the ea vowel combination. But for kept, twelve children wrote keeped, four wrote kepted, sixteen wrote ceped. Other variations were keped, cepted, cepped and cepeted.

It is interesting to note that the maximum number of overgeneralizations occurred at the Year 3 level, although for the low frequency words the numbers are too small to be in any way significant. For kept, which produced the highest number of overgeneralizations, 48, 14 of these occurred at Year 2 level, 23 at Year 3, and 11 at Year 4. When these figures are considered in relation to the results for the regular past tense, it would appear that the initial stage is to use a phonetic spelling, which produces incorrect spelling for a regular word such as looked, but correct spelling for irregular words such as kept. However, having learned the rule for producing the past tense morpheme correctly, the child then overgeneralizes the rule, so that looked is now correct, but kept is incorrect. In fact, none of the children who spelled kept with a final ed used a phonetic spelling for looked.

It was also observed that some of the children who overgeneralized the ed ending to the irregular past tense also used the same system for words such as cost and next, which have a final /t/ sound. One subject who wrote kepted spelled next as nexted; other spellings for next were nexed, nescked and nexsed, while cost appeared as costed, cosed and cossed.

General Spelling Performance

The data were then analysed according to general spelling performance instead of year levels, using the three ability groups. For details of the selection criteria and the composition of the groups, see pages 25 and 26 .Table 28 shows the percentages of correct responses for the spelling of the regular past tense morpheme, tabulated by ability groups for both high and low frequency words.

TABLE 28

Percentages of correct responses for the spelling of the regular past tense morpheme, tabulated by spelling ability groups for both high and low frequency words.

	High frequency words	Low frequency words
Low ability	38.5	27.0
Medium ability	87.7	68.6
High ability	99.0	94.1

As with the compound words and the addition of suffixes, spelling ability was a better predictor than year level of the ability to make use of morphemic information. The high ability group showed almost complete mastery of the morphological rule for spelling the past tense inflexion for both high and low frequency words, a better result than that achieved by Year 4 children. While the results for Year 3 and the medium ability group were similar, the low ability group showed much less ability to apply the morphological rule than the Year 2 children.

Table 29, the percentages of responses for the regular past tense morpheme on both high and low frequency words, tabulated by ability groups, shows the same type of distribution. For the high frequency words, the correct spelling was produced for almost every word by the high ability group, with only two examples of an apparent phoneme-grapheme matching strategy. However, the low ability group appeared to be much more reliant on a phoneme-grapheme matching strategy, with more children spelling the /d/ morpheme with d than with ed. For the low frequency words the same pattern emerged; although there were more examples of a phoneme-grapheme matching strategy for the high ability group, the low ability group apparently used such a strategy for both the /d/ and /t/ morphemes more frequently than they applied the morphological rule. The low ability group also produced very high results in the "other" category, where few children of high ability appeared.

TABLE 29

Percentage responses for the regular past tense morpheme on high and low frequency words, tabulated by spelling ability groups.

High frequency words

		ed	t	d	other vowel + d or t	et	other
/ɛd/ started needed	Low ability	48.3	1.7	10.9	5.5	0	33.6
	Medium ability	92.2	0.4	1.2	1.2	0	4.9
	High ability	99.2	0	0.4	0	0	0.4
/t/ asked looked	Low ability	36.5	25.6	8.0	0	1.3	28.6
	Medium ability	86.5	3.3	0.8	0	2.4	7.0
	High ability	98.3	0	0	0	0	1.7
/d/ moved called	Low ability	30.7	9.2	33.6	0	1.3	25.2
	Medium ability	84.4	0.4	9.2	0	0	6.1
	High ability	99.6	0	0.4	0	0	0

Low frequency words

		ed	t	d	other vowel + d or t	et	other
/ɛd/ amounted halted	Low ability	40.7	3.8	10.1	5.5	2.5	37.4
	Medium ability	82.0	0.8	2.4	0.8	1.2	12.7
	High ability	98.3	0	0.8	0	0.4	0.4
/t/ untouched blinked	Low ability	21.8	25.2	4.6	0.8	2.1	45.4
	Medium ability	69.3	8.6	1.2	0	2.4	18.4
	High ability	93.7	1.7	0	0	0.4	4.2
/d/ consumed teased	Low ability	18.5	15.5	23.9	0	0	42.0
	Medium ability	54.5	7.8	17.6	0.8	1.2	18.0
	High ability	90.3	0.8	4.6	0	0	4.2

Table 30 shows the percentages of responses for the irregular past tense morpheme, for both high and low frequency words, tabulated by ability groups. The results for the high frequency words reveal an interesting pattern, with the maximum number of overgeneralizations concentrated in the medium ability group. There were only eight examples of overgeneralization in the high ability group, whereas there were 20 examples for the Year 4 children. The children in the high ability group produced mainly correct spellings; apart from the eight overgeneralizations there were only four "other" responses. With the medium ability group, the overgeneralization was the most common incorrect response; it was only in the low ability group that the number of "other" responses was greater than the ed responses. This pattern suggests that many children in the medium ability group were at a transitional stage, where they had learned to apply the morphological rule, but had not yet learned where it is not applicable.

TABLE 30

Percentage responses for the past tense morpheme on irregular high and low frequency words, tabulated by spelling ability groups.

High frequency words - kept, held.

	correct	ed ending	other
Low ability	63.0	8.4	28.6
Medium ability	72.5	20.1	7.4
High ability	94.9	3.4	1.7

Low frequency words - rebuilt, dealt.

	correct	ed ending	other
Low ability	66.4	1.3	32.3
Medium ability	86.9	2.0	11.1
High ability	93.3	1.3	5.5

The Spelling of the Past Tense Morpheme by Bilingual Children

Using information gathered from the teachers during the initial school visit, the children were divided into two groups, bilingual and monolingual. There were 81 bilingual children, and 279 monolinguals. Those children with less than 2½ years at school in an English speaking country were excluded from the study, but otherwise there was no information on the bilingual children's facility with the second language.

However, while the limitations of the data are recognized, it was considered that an analysis of the data, using the language background of the children instead of year level, might provide some insight into the way in which second language learners learn to apply morphological rules. Table 31 shows the percentages of correct responses for the spelling of the regular past tense morpheme, tabulated by language background for both high and low frequency words.

TABLE 31

Percentages of correct responses for the spelling of the regular past tense morpheme, tabulated by language background for both high and low frequency words.

	High frequency words	Low frequency words
Bilingual children	70.6	58.0
Monolingual children	76.5	64.8

For both high and low frequency words, the monolingual children were better at applying the morphological rule for forming the regular past tense, but the difference was only around 6%, and was almost the same for both high and low frequency words.

Table 32 shows the percentages for each type of response for the regular past tense morpheme, tabulated by the language background of the children for both high and low frequency words. The results showed a smaller percentage of bilingual children producing the correct response for each category of past tense morpheme for both high and low frequency words, and a larger percentage in the "other" category, but the differences were not great, and no specific error pattern emerged. In particular, the percentages of children apparently using a phoneme-grapheme matching strategy showed very little variation between the monolingual and bilingual groups. It would appear that while the bilingual children were slightly less competent in applying the morphological rule, they were not attempting to represent the sound, instead of applying the rule, any more than were the native speakers.

TABLE 32

Percentage responses for the regular past tense morpheme on high and low frequency words, tabulated by language background.

High frequency words

		ed	t	d	other vowel + d or t	et	other
/ɛd/ started needed	Bilingual	75.3	1.2	4.3	2.4	0	16.7
	Monolingual	81.4	0.5	4.1	2.6	0	11.8
/t/ asked looked	Bilingual	71.0	7.4	4.3	0	1.9	15.4
	Monolingual	74.7	10.2	2.5	0	1.1	11.5
/d/ moved called	Bilingual	65.4	4.9	14.8	0	1.9	13.0
	Monolingual	73.5	2.7	14.2	0	0	9.7

Low frequency words

		ed	t	d	other vowel + d or t	et	other
/ɛd/ amounted halted	Bilingual	67.3	3.1	3.7	0.6	3.1	22.2
	Monolingual	75.6	1.1	4.7	2.5	0.9	15.2
/t/ untouched blinked	Bilingual	59.2	13.3	1.2	0	2.5	24.1
	Monolingual	62.4	11.5	2.2	0.4	1.4	22.2
/d/ consumed teased	Bilingual	47.5	9.3	14.8	0	0.6	27.8
	Monolingual	56.5	7.7	15.6	0.4	0.4	19.5

The percentage responses of the bilingual and monolingual children for the irregular past tense forms are shown in Table 33. There was very little difference in the percentages of overgeneralizations for monolingual and bilingual children; once again, the results did not indicate that the bilingual children used spelling strategies that differed from those used by the monolingual children.

TABLE 33

Percentage responses for the past tense morpheme on irregular high and low frequency words, tabulated by language background.

High frequency words - kept, held.

	correct	ed	other
Bilingual children	74.7	9.3	16.0
Monolingual children	77.4	11.1	11.5

Low frequency words - rebuilt, dealt.

	correct	ed	other
Bilingual children	74.1	1.8	24.1
Monolingual children	84.6	1.4	14.0

DISCUSSION

It would appear that for many children the rule for spelling the past tense morpheme is difficult to acquire, which is not surprising, considering the complexity of the task. Many of the Year 2 children were representing sound, rather than applying the morphological rule, and even by the end of Year 4 some children were still using a phoneme-grapheme matching strategy. However, the ability to spell the past tense morpheme correctly was more closely related to spelling ability than to Year level at school; it was the low ability group which produced the highest number of responses which reflected the sound, rather than meaning. It may be that children who are generally poor spellers need to have their attention directed to the way in which the rule operates, although competent spellers appear to learn to operate the rule without necessarily having conscious knowledge of the way it works.

The way in which many of the children went about the task of spelling the irregular past tense forms showed that they were attempting to apply a rule, not merely reproducing a spelling which had been learned by rote, nor representing the sound of the word. The overgeneralization of the rule for forming the past tense, where kept is spelled as keeped or ceped, replicates the phenomenon often observed in young children's acquisition of oral language, where a child who has used a correct past tense form such as went will revert to using goed, as the rule is acquired. When the exceptions to the rule are learned, the child will resume using the form went. That this process can be observed in the child's acquisition of written language indicates that the process may be similar. If learning to spell entails learning the rules governing the orthography, spelling programs which are based on rote learning would appear to be unsuitable for young children who are in the process of acquiring the rules.

The results for the bilingual children revealed no difference in the types of strategies used to spell the past tense morpheme. While the bilingual children, as a group, were generally less competent at applying the rule, the difference was not great, and the pattern was similar to that shown in their use of morphemic information in spelling compound words and in the addition of suffixes: they performed the task slightly less competently, but no specific areas of difficulty emerged. This suggests that the need is not for any specialized teaching, but for more attention to be given to the bilingual children's general language development.

It should be useful for teachers to be aware of the elements involved in learning to spell the past tense morpheme correctly. The child who writes keeped or heled may appear to have made a bad spelling mistake, but the informed teacher would be able to understand the reason for the mistake, and to appreciate that this child may be in the process of developing into a competent speller. Children who have difficulty progressing from a phoneme-grapheme matching strategy should also benefit from the guidance of a teacher who understands the nature of their difficulties.

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